

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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IPW

Applicant: Paul Shirley et al.

Title: SPINDLE CHUCK CLEANER

Docket No.: 303.774US2

Filed: February 13, 2004

Examiner: Bibi Sharidan Carrillo

Serial No.: 10/777,957

Due Date: January 3, 2007

Group Art Unit: 1746

MS Appeal Brief - Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450



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X Reply Brief Under 37 CFR § 41.41 (14 pgs.).

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SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

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Name

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SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

(GENERAL)

S/N 10/777,957

PATENT

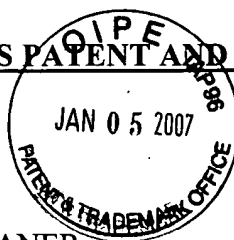
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REPLY BRIEF UNDER 37 CFR § 41.41

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Commissioner for Patents
P.O. Box 1450
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This Reply Brief is filed in response to the Examiner's Answer, mailed November 3, 2006. Please charge any required additional fees or credit overpayment to Deposit Account 19-0743.

Reply to Examiner's Answer (6) New Grounds of Rejection

A) The Applicable Law for Rejections Under 35 U.S.C. § 103

According to *M.P.E.P.* § 2141, which cites *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986), the following tenets of patent law must be adhered to when applying 35 U.S.C. § 103. First, the claimed invention must be considered as a whole. Second, the references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination. Third, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention. Fourth, obviousness is determined using a reasonable expectation of success standard. Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. *M.P.E.P.* § 2141 (citing *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966)).

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art

reference (or references when combined) must teach or suggest all the claim limitations.

M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d, 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Appellant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). The references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. *M.P.E.P.* § 2142 (citing *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985)). In considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *M.P.E.P.* § 2144.01 (citing *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968)). However, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *M.P.E.P.* § 2143.01 (citing *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)).

In order to take into account the inferences which one skilled in the art would reasonably make, the examiner must ascertain what would have been obvious to one of ordinary skill in the art at the time the invention was made, and not to the inventor, a judge, a layman, those skilled in remote arts, or to geniuses in the art at hand. *M.P.E.P.* § 2141.03 (citing *Environmental Designs, Ltd. v. Union Oil Co*, 713 F.2d 693, 218 USPQ 865 (Fed. Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984)).

The examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention. The tendency to resort to "hindsight" based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

M.P.E.P. § 2141.03.

B. New Rejection: Claims 34-39 and 55-62 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240).

C. Discussion of the rejection of Claims 34-39 and 55-62 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240).

Claim 33 recites “...moving the cleaning surface into contact with the support adapted to releasably hold a wafer; and removing contaminants from the support by vacuuming the contaminants through the cleaning head assembly.” As pointed out in the response of October 28, 2005, the Akune reference removes contaminants from the support or spin chuck in the opposite way from the invention of claim 33. Rather than vacuuming the contaminants through the cleaning head, the spin chuck cleaning device of the Akune reference removes contaminants by jetting them off. In other words, contaminants are removed by literally blowing them off the spindle chuck or support with a “jet port jetting acetone and N₂ gas” (see lines 4 and 5 of the Solution portion of the Abstract of the Akune (formerly referred to as Akune) reference. The acetone is needed to dissolve any photoresist that is stuck to the chuck or wafer support surface (see page 6, paragraph 17 of the translation of the Akune reference provided by the USPTO).

It appears that the Akune reference teaches away from using a vacuum source. Akune uses a vacuum chuck. In other words, the semiconductor wafer is held in place by a vacuum source acting through the chuck or surface supporting the semiconductor wafer. Akune states that one of the reasons for the cleaning system is to reduce wafer damage during the spreading of the photoresist, “...which is caused by the inferiority of the vacuum chuck to dusts of the spin chuck surface and photoresists attached to the spin chuck surface...” (See page 9, paragraph 25 of the translation of the Akune reference provided by the USPTO). This seems to suggest that the vacuum ports of the vacuum chuck are unable to keep the support surface of the chuck clean. Therefore, one of ordinary skill in the art of chuck cleaning using a vacuum would not be

disposed to employ this reference when building a cleaning device that employed a vacuuming step, since it appears to include a teaching away of using a vacuuming step to clean the support surface.

In addition, one of ordinary skill in the art of cleaning a chuck or head for holding the wafers in a clean environment would not look to a reference (Akune) that would introduce a reactive organic compound, namely acetone, into the clean environment. Furthermore, one of ordinary skill in the art of cleaning a chuck or head for holding the wafers in a clean environment would not look to a reference that potentially introduces a damaging solvent or other particles into the clean environment. The spin chuck cleaning device of the Akune reference removes contaminants by jetting them off using a jet port jetting acetone and N₂ gas. Using Akune would introduce reactive acetone into a clean environment as well as the particles from the cleaning chuck.

Even if one was disposed to look to the Akune reference, modifying the Akune reference with the Madea et al. reference, as suggested by the Examiner, would destroy the Akune reference. No matter how the Akune reference is modified with the Madea et al. reference, the Akune reference is destroyed. If the vacuum device of Madea et al. is substituted for the jet ports of Akune, the Akune reference is destroyed (see responses, sections B, D and E of the Response dated October 28, 2005). Modifying the Akune reference in this fashion would destroy one of the main purposes or functions of the Akune reference, namely to clean the spin chuck by jetting the spin chuck with acetone and N₂ gas. Simply put, the purpose of the Akune device would be destroyed if modified with the Madea et al. as suggested by the Office Action. In addition to destroying the purpose of the Akune reference, there would be no reasonable expectation of success since pulling a vacuum through the jet ports of Akune also would not work. Jet ports are small. Pulling a vacuum through the jet ports of Akune would result in a very small vacuum force. Contaminant particles could plug the small jet ports.

In the advisory action of November 10, 2005, the Examiner suggested another modification. The Examiner suggested adding the Madea et al. vacuum to the jet ports of Akune. In such an arrangement, the vacuum of Madea et al. will work against the jet ports of Akune thereby compromising the cleaning ability of the device. In other words, adding the vacuum device of Madea et al. to supplement the jet port of Akune compromises the jetting

action used to clean the spindle chuck thereby destroying the Akune reference. In one instance, the Madea et al. vacuum will remove some of the acetone and N₂ gas thereby compromising the jetting action of the acetone and N₂ gas. If somehow the Madea et al. vacuum can be arranged so that none of the fluids passing from the jet port are removed by the Madea et al. vacuum, the pressure differential used to jet off the spindle will be reduced thereby reducing the effectiveness of the jet ports. In addition, the acetone of Akune is needed to dissolve any photoresists attached to the chuck or semiconductor support surface (See page 6, paragraph 17 of the translation of the Akune reference provided by the USPTO). The combination suggested by the Examiner, namely to use both the jets and acetone of Akune and the device of Madea et al. would also destroy the Akune reference since the vacuum of Madea et al. may remove the acetone before it dissolves the photoresists. The amount of acetone needed to clean the surface in such an arrangement would be increased since the length of time for dissolving the old photoresist would be decreased by quickly removing the acetone using the vacuum.

As a result, a proper prima facie case of obviousness is not made since no matter how these two references are combined, the Akune reference is destroyed. This destruction of the purpose of the reference is evidence against a reason to modify or combine the references. In addition there is no reasonable expectation of success since the combination would either not work, or the effectiveness for cleaning would be compromised since the vacuum would work against the jet ports and vice versa. In addition, the introduction of acetone (a reactive organic molecule) and particles into the clean environment also lessens any reasonable expectation of success. If the vacuum of Madea et al. is to be used without the jet ports of Akune, then the jet ports of Akune have been rendered ineffective, thus destroying the Akune reference.

In addition, the Madea et al. reference teaches removing contaminants from an entirely different portion of the semiconductor fabrication apparatus. Madea et al. does not even teach or suggest removing contaminants from the support or spindle chuck but, rather, teaches cleaning of the gas manifold for placing gas into the chamber during a chemical vapor deposition process. Therefore, it is doubtful one of ordinary skill in the art of cleaning a chuck or head for holding the wafers would look to a reference that cleaned an entirely different portion of a semiconductor fabrication apparatus.

As a result, the Office Action failed to set forth a proper prima facie case of obviousness with respect to claim 33 since there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. In fact, combining the teachings as suggested by the Examiner would destroy the purpose of the Akune reference. This destruction of the purpose of the reference is evidence against a reason to modify or combine the references. In addition there is no reasonable expectation of success since the combination would not work, for the reasons described above. In addition, using the Akune reference will introduce contaminant particles and reactive organic molecules into the clean environment.

The Sada et al. reference does not appear to teach cleaning any portion of the wafer handling device (neither the substrate support surface/chuck or the gas manifold). Sada et al. teaches an arm 23 which cleans the substrate after the circuits are formed. Therefore, the Sada et al. reference does not appear to add any missing element or help overcome any of the arguments stated above other than the fact that it shows that the chuck is made from steel or a metal. This reference adds an element recited in claims 38 and 39. However, claims 38 and 39 still depend from claim 33 and do not overcome the combination suggested for the reasons stated above with respect to claim 33.

Claims 34-37 also depend from claim 33 and include the recitations of claim 33 by their dependency. As a result, claims 34-39 now also overcome the rejection under 35 U.S.C. § 103(a) as being unpatentable over Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240) since the Examiner has failed to set forth a proper prima facie case of obviousness.

Claim 55 recites "...removing contaminants from the support adapted to releasably hold a wafer by vacuuming the contaminants through the cleaning surface." Applicant cannot find these features in Akune. In fact, the Akune reference teaches exactly the opposite since contaminants are removed from the support by the "jetting of acetone...and jetting of N₂ gas..." (See penultimate line of the Abstract of Akune) through the cleaning head assembly. The "...cleaning head part 51 includes "...a jet port jetting acetone and N₂ gas..." (See line 4 of the second paragraph of the Abstract of Akune).

One of ordinary skill in the art of cleaning a chuck or head for holding the wafers in a clean environment would not look to a reference (Akune) that would introduce a reactive organic compound, namely acetone, into the clean environment. Furthermore, one of ordinary skill in the art of cleaning a chuck or head for holding the wafers in a clean environment would not look to a reference that potentially introduces particles into the clean environment. The spin chuck cleaning device of the Akune reference removes contaminants by jetting them off using a jet port jetting acetone and N₂ gas. Using Akune would introduce reactive acetone into a clean environment as well as propel the particles from the cleaning chuck into the clean chamber which is used for processing the wafer and through which the photoresist is passed before hitting the surface of the wafer and spread on the wafer.

Even if one was disposed to look to the Akune reference, modifying the Akune reference with the Madea et al. reference, as suggested by the Examiner, would destroy the Akune reference. No matter how the Akune reference is modified with the Madea et al. reference, the Akune reference is destroyed. If the vacuum device of Madea et al. is substituted for the jet ports of Akune, the Akune reference is destroyed (see responses, sections B, D and E of the Response dated October 28, 2005). Modifying the Akune reference in this fashion would destroy one of the main purposes or functions of the Akune reference, namely to clean the spin chuck by jetting the spin chuck with acetone and N₂ gas. Simply put, the purpose of the Akune device would be destroyed if modified with the Madea et al. as suggested by the Examiner. In addition to destroying the purpose of the Akune reference, there would be no reasonable expectation of success since pulling a vacuum through the jet ports of Akune also would not work. Jet ports are small. Pulling a vacuum through the jet ports of Akune would result in a very small vacuum force. Contaminant particles could plug the small jet ports.

In the advisory action of November 10, 2005, the Examiner suggested another modification. The Examiner suggested adding the Madea et al. vacuum to the jet ports of Akune. In such an arrangement, the vacuum of Madea et al. will work against the jet ports of Akune thereby compromising the cleaning ability of the device. In other words, adding the vacuum device of Madea et al. to supplement the jet port of Akune compromises the jetting action used to clean the spindle chuck thereby destroying the Akune reference. In one instance, the Madea et al. vacuum will remove some of the acetone and N₂ gas thereby compromising the

jetting action of the acetone and N₂ gas. If somehow the Madea et al. vacuum can be arranged so that none of the fluids passing from the jet port are removed by the Madea et al. vacuum, the pressure differential used to jet off the spindle will be reduced thereby reducing the effectiveness of the jet ports. In addition, the combination suggested by the Examiner, namely to use both the jets and acetone of Akune and the device of Madea et al. would also destroy the Akune reference since the vacuum of Madea et al. may remove the acetone before it dissolves the photoresists. According to the Akune reference, acetone is needed to dissolve any photoresists attached to the chuck or semiconductor support surface (See page 6, paragraph 17 of the translation of the Akune reference provided by the USPTO). The amount of acetone needed to clean the surface in such an arrangement would be increased since the length of time for dissolving the old photoresist would be decreased by quickly removing the acetone using the vacuum. Increased amounts of acetone would provide for a greater chance of contamination of the chamber with acetone. Therefore, increased amounts of nitrogen or air would be needed to flush the chamber. Increased amounts of time result in increased processing time for the semiconductor wafers. This translates into increased manufacturing time and decreased profits. Still another aspect is that the system suggested by the Examiner is now more complex than the Akune system or the Madea et al. system. Madea et al. does not even clean the same surface. In addition, the Sada et al. reference seems only to be cited for a chuck or support surface made of metal or steel. Sada et al. fails to teach a cleaning system for any of the fabrication machinery and therefore fails to teach a cleaning system for the chuck or the manifold and therefore does not help overcome the shortcomings of Akune and Madea et al. discussed above.

As a result, a proper prima facie case of obviousness is not made since no matter how these two references are combined, the Akune reference is destroyed. This destruction of the purpose of the reference is evidence against a reason to modify or combine the references. In addition there is no reasonable expectation of success since the combination would either not work, or the effectiveness for cleaning would be compromised since the vacuum would work against the jet ports and vice versa. In addition, the introduction of acetone (a reactive organic molecule) and particles into the clean environment also lessens any reasonable expectation of success. If the vacuum of Madea et al. is to be used without the jet ports of Akune, then the jet ports of Akune have been rendered ineffective, thus destroying the Akune reference.

In addition, the Madea et al. reference teaches removing contaminants from an entirely different portion of the semiconductor fabrication apparatus. Madea et al. does not even teach or suggest removing contaminants from the support or spindle chuck but, rather, teaches cleaning of the gas manifold for placing gas into the chamber during a chemical vapor deposition process. Therefore, it is doubtful one of ordinary skill in the art of cleaning a chuck or head for holding the wafers would look to a reference that cleaned an entirely different portion of a semiconductor fabrication apparatus. Sada et al. fails to teach a cleaning system for any of the fabrication machinery, much less the chuck or semiconductor wafer support. Therefore, one of ordinary skill in the art of cleaning the fabrication machinery would not look to Sada et al. since it is devoid of such a cleaning apparatus.

As a result, the Examiner failed to set forth a proper prima facie case of obviousness with respect to claim 55 since there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. In fact, combining the teachings as suggested by the Examiner would destroy the purpose of the Akune reference. This destruction of the purpose of the reference is evidence against a reason to modify or combine the references. In addition there is no reasonable expectation of success since the combination would not work, for the reasons described above. In addition, using the Akune reference will introduce contaminant particles and reactive organic molecules into the clean environment.

Claims 56-62 depend from claim 55 and include the recitations of claim 55 by their dependency. As a result, claims 56-62 now also overcome the rejection under 35 U.S.C. § 103(a) as being unpatentable over Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240).

In summary, neither the Office Action dated June 2, 2005, the Advisory Action dated November 10, 2005, or the new grounds of rejection in the Examiner's answer to the Appeal Brief, set forth a proper prima facie case of obviousness with respect to the claims since there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. In fact, combining the teachings would destroy the purpose of the Akune reference. This destruction of the purpose of the reference is evidence against a reason to modify or

combine the references. In addition there is no reasonable expectation of success since the combination would not work, for the reasons described above. Moreover, the Office Action appears to have used the Appellants' disclosure as a road map for the combination. As a result, the claims now overcome the rejection under 35 U.S.C. § 103(a) as being unpatentable over Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240).

Appellant submits that the Examiner's rejections are now overcome.

D. New Rejection: Claims 40-41 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune in view of Maeda et al. as evidenced by Sada et al., as applied to claims 34-39 and 55-62, and further in view of Su et al. (U.S. Patent No. 5,507,874).

E. Discussion of the rejection of Claims 40-41 rejected under 35 U.S.C. § 103(a) as being unpatentable Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240), as applied to claims 34-39 and 55-62, and further in view of Su et al. (U.S. Patent No. 5,507,874).

Claims 40-41 depend from claim 33 and are believed to be allowable since one of ordinary skill in cleaning a support in a clean environment would not look to a device that would introduce particles and organic contaminants into the clean environment. Furthermore, even if one of ordinary skill was to combine Akune with Maeda et al., the combination would destroy Akune. As discussed above, there is no reason for the combining these references as evidenced by the destruction of the Akune reference. If the vacuum of Maeda et al. is substituted for the jets of Akune, Akune is destroyed. If the vacuum of Maeda et al. is added to the jets of Akune, the Akune reference is rendered additionally complex and more wasteful of cleaning solvents and neutralizing solvents. The amount of pressure applied to jet off the contaminants would also be reduced. In addition, the introduction of the particles and the organic contaminants into the clean environment lessens or removes any expectation of success. Adding the Sada et al. reference and the Su reference fails to cure the flaws associated the combination of Akune and Maeda et al. The fact that Su et al. teaches a specific cleaning material does not cure the shortcomings resulting from combining the Akune and the Maeda et al. references. The same can be said for

Sada et al. since it fails to teach cleaning any of the fabrication equipment but is rather directed at cleaning the semiconductor wafer. Simply put, neither Sada et al. or Su, alone or in combination, cures the defect resulting from combining the Akune reference and the Maeda et al. reference as discussed above under the discussion under B). As a result, the Examiner has also failed to make out a proper prima facie case of obviousness with respect to claims 40-41. Claims 41-41 are not obvious over the combination of Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240), as applied to claims 34-39 and 55-62, and further in view of Su et al. (U.S. Patent No. 5,507,874).

F. New Rejection: Claim 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune in view of Maeda et al. as evidenced by Sada et al., as applied to claims 34-39 and 55-62, and further in view of Satterfield et al. (U.S. Patent No. 5,364,144).

G. Discussion of the rejection of Claims 34-39 and 55-62 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240), as applied to claims 34-39 and 55-62, and further in view of Satterfield et al. (U.S. Patent No. 5,364,144).

Claim 42 depends from claim 33 and is believed to be allowable since one of ordinary skill in cleaning a support in a clean environment would not look to a device that would introduce particles and organic contaminants into the clean environment. Furthermore, even if one of ordinary skill was to combine Akune with Maeda et al., the combination would destroy Akune. As discussed above, there is no reason for the combining of these references as evidenced by the destruction of the Akune reference. In fact, as also discussed above, the Akune reference is destroyed no matter which way the combination is interpreted (Examiner's interpretation or Appellant's interpretation). In addition, the introduction of the particles and the organic contaminants into the clean environment lessens or removes any expectation of success. Adding the Sada et al. or the Satterfield reference (alone or in combination) fails to cure the flaws associated the combination of Akune and Maeda et al. The fact that Satterfield et al. teaches a specific cleaning material does not cure the shortcomings resulting from combining the Akune and the Maeda et al. references. Furthermore, the fact that Sada et al. fails to teach cleaning any

portion of the wafer fabrication machinery also does not cure the shortcomings resulting from the combination of Akune and Madea et al. Simply put, Satterfield and Sada et al. do not cure the defect resulting from combining the Akune reference and the Maeda et al. reference as discussed above under the discussion under C). As a result, the Examiner has also failed to make out a proper prima facie case of obviousness with respect to claim 42. Claims 42 is not obvious over the combination of Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240), as applied to claims 34-39 and 55-62, and further in view of Satterfield et al. (U.S. Patent No. 5,364,144).

Reply to Examiner's Answer (9) Grounds of Rejection

A. Rejection: Claims 34-39 and 55-62 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240).

B. Response: Same as the above response "Reply to Examiner's Answer (6) New Grounds of Rejection", subheading C.

C. Rejection: Claims 40-41 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune in view of Maeda et al. as evidenced by Sada et al., as applied to claims 34-39 and 55-62, as described in paragraph 4 in the Examiner's Answer, and further in view of Su et al. (U.S. Patent No. 5,507,874).

D. Response: Same as the above response "Reply to Examiner's Answer (6) New Grounds of Rejection", subheading E.

E. Rejection: Claim 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune in view of Maeda et al. as evidenced by Sada et al., as applied to claims 34-39 and 55-62,

as described in paragraph 4 in the Examiner's Answer, and further in view of Satterfield et al. (U.S. Patent No. 5,364,144).

F. Response: Same as the above response "Reply to Examiner's Answer (6) New Grounds of Rejection", subheading G.

Reply to Examiner's Answer (6) New Grounds of Rejection

Claims 34-39 and 55-62 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune (JP10-294261) in view of Maeda et al. (U.S. Patent No. 5,330,577), as evidenced by Sada et al. (U.S. Patent No. 6,062,240).

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Claim 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable Akune in view of Maeda et al. as evidenced by Sada et al., as applied to claims 34-39 and 55-62, as described in

paragraph 4 in the Examiner's Answer, and further in view of Satterfield et al. (U.S. Patent No. 5,364,144).

Conclusion

The Appellant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6977 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

PAUL SHIRLEY ET AL.

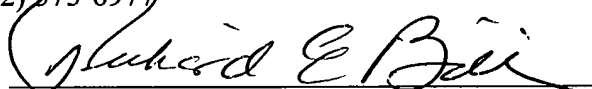
By their Representatives,

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Date

1/03/07

By



Richard E. Billion

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